

REMARKS

Claim Rejections - 35 USC § 112

Claims 1-20 are rejected under 35 USC § 112, first paragraph, as "containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s) at the time application was filed, had possession of the claimed invention." Specifically, the examiner asserts that "the higher metal density as by forging being *only* at the splines is considered new matter. The 'forged splines' as originally presented was not necessarily limited to only the splines and as now required by the different densities."

Amended article claim 1, and the corresponding amended method claim 7, claim spline sidewalls and engagement edges and an actuating wall having a second metal density, the second metal density higher than the nut body first metal density. As discussed in the examiner interview conducted on October 7, 2004, this is fully supported by the specification as originally filed, specifically the first full paragraph on page 15:

It is also well known in the arts that structures formed by forging have a superior integrity to those structures formed by machining. The act of machining a knurl pattern creates knurl structures by substantially removing material from the nut body through cutting forces. In contrast, *forming the splines 20 through a forging process results in material being compressed into the desired shape* by a stamping action. This results in an *increased material density in the forged spline and actuating wall areas*, resulting in a corresponding increased structural integrity of the spines 20 as compared to prior art knurl structures. {Emphasis added.}

This is also supported by the paragraph beginning at line 16 of page 13 of the specification as originally filed:

What is new in the present invention is *forming of substantial member-engaging elements by a forging process*. The present invention can be practiced with either hot or cold forging techniques. What is important is that *member-engaging elements of a substantial depth and height are formed*, so that the deformable locking member cold-flows about the member-engaging elements and engages them substantially... {Emphasis added.}

Moreover, claim 7 as originally filed unambiguously described the *forging* of the splines and actuating walls as *separate steps* from the "*providing*" of the nut body. Thus, the specification

clearly establishes the forging of the splines and actuating walls as separate from the creation and/or provision of the nut body itself. And, furthermore, as previously established in the responsive amendments and Declaration of inventor T. Wolf Sr., increased density inherently results from the forging process.

Therefore, the greater density of the splines and actuating wall relative to that of the nut body is clearly supported by the specification as originally filed, and claims 1-13, 15, 16, 18 and 19 are believed allowable under 35 USC § 112.

Specification

The examiner has objected to the specification because of "informalities" regarding claim terminology with respect to "relative densities" and "metal grain flow contour".

As established above in the discussion regarding the claim rejections under 35 USC, section 112, and as discussed in the examiner interview conducted on October 7, 2004, the specification as originally submitted clearly supports specific claim terminology related to the "relative densities" claim limitations present in independent claims 1 and 7 and, therefore, also present in all of the remaining the dependent claims.

With respect to the examiner's objection to the "metal grain flow contour" claim limitations, these limitations appear only in previously added claim 20, which is hereby canceled in the present responsive filing, thus obviating the examiner's objection.

Claim Rejections - 35 USC § 103

Claims 1, 3-7 and 9-20 are rejected under 35 USC § 103(a) as being unpatentable over Hollinger (US Pat. No. 3316952) in view of Wesley (US Pat. No. 2,378,610).

In order for a claimed invention to be rejected on obviousness, the prior art must suggest the modifications sought to be patented. In re Gordon, 221 U.S.P.Q. at 1127; ACS Hospital System, Inc. v. Montefiore Hospital, 221 U.S.P.Q. at 933.

Independent article claim 1 and method claim 7 have been amended to more clearly claim invention structure and method limitations not taught by Hollinger in view of Wesley.

Specifically, claim 14 has been canceled and its limitations incorporated into presently amended article claim 1, and additional structural limitations have also been incorporated into amended claim 1 that are fully supported by the specification as originally filed; and claim 18 has also been canceled and its limitations incorporated into amended method claim 7, and additional method step limitations have also been incorporated into amended claim 7 that are fully supported by the specification as originally filed. Both amended claims 1 and 7 now define *forged triangular* splines with *planar* sidewalls forming *pointed linear* engagement edges *parallel* to the central axis and *extending* from the top surface to the actuating wall (thus, through the *entire aperture*), further forming *triangular spline* voids, the splines and actuating wall having a *higher second metal density* than the nut body through *forging*. This is further emphasized in the method claim 7, wherein the “*providing*” of the nut body is a second step distinct from the “*forging*” of the spline and actuating wall structure.

These limitations are supported by the specification specifically and generally at page 6, last line, through page 7, line 4, page 8, lines 1 through 14, page 14, lines 3-7 and 18-22 and by the Figures, particularly Figure 6 with respect to the splines extending throughout the void.

Moreover, the limitations of claims 14 and 17 have been incorporated into amended claims 1 and 7, respectively; the sidewall angle from about 60 degrees to about 120 degrees and edge pitch value per inch between about 10 to about 24.

As discussed in the examiner's interviews of June 4, 2004 and October 7, 2004, these structures and methods are not taught by Hollinger in view of Wesley. Hollinger teaches the formation of his insert-engaging structures through machining methodology. This results in forming the structures through cutting techniques that inherently weaken the structure of the elements formed thereby, as established in the previously filed Declaration under Rule 132 by inventor Theodore L. Wolf. Hollinger does not teach the first and second densities, wherein the splines and actuating wall have a higher density than that of the remaining nut body elements, and offers no teaching on forming his voids or “splines” through methods that result in increased material density.

(Applicants have reviewed the examiner's discussion of the threaded body length limitations, but still maintain their position of inventive novelty with respect to these limitations

as claimed by amended claims 1 and 7 and as established in their earlier papers; however, the issue is believed moot at this time, as new reasons for allowability have been proffered herein.)

As also discussed in the examiner interviews of June 4 and October 7, 2004, though Wesley teaches small nut structures formed by "stamping" lightweight metals, Wesley does not teach higher density spline walls and edges extending from a higher density actuating wall throughout the aperture to the top surface. A review of his Figures clearly shows that his projections extend no further upward than the *bottom half* of his aperture.

Moreover, Wesley also fails to teach insert-engaging structures with angle and pitch array dimensions as specifically claimed; triangular splines having planar sidewalls meeting to form a pointed linear engagement edge extending from the top surface to the actuating wall parallel to the central axis, the sidewalls defining an *angle* with a value of *from about 60 to about 120 degrees* and the engagement edges arrayed with a *pitch value per inch* of *between about 10 to about 24*. As established by paragraph 10 of the Declaration under Rule 132 by inventor Theodore L. Wolf submitted previously:

10. ... The only example Wesley provides has an insert aperture with a 17/64 inch diameter and a 3/32 inch height, the nut bore diameter of 5/32 inch and the entire "nut blank" having a height under 5/16 inch. (As described in his specification at the fourth column, lines 11 through 41.) Wesley's lock nuts are small, lightweight nuts for aircraft applications, produced by stamping sheet metal stock (see the third column, lines 17 to 33), and even then *he limits the number of his insert-engaging "projections" to "eight" due to the necessity of avoiding "tool breakage" in engaging the metal blank material and forming the projections*. (See his figures and the second column, lines 29-43, and fourth column, lines 11 through 41.) Additionally, it has been my experience that the limited number of projections taught by Wesley does not sufficiently engage a locking insert during application and removal. But *most importantly, the Wesley sheet metal stamping processes do not produce the higher tensile lock nut structures with increased spline and wall material density and homogenous grain contour lines formed through forging equivalent to our invention, and Wesley offers no guidance in forming them*.

Thus, the *maximum* pitch value taught by Wesley is eight projections distributed through an insert aperture with a 17/64 inch (0.27 inch) diameter and, thus, a 0.83 inch circumference. This equals at most a pitch value per inch of 9.64, which is lower than the range of pitch values claimed by the present invention.

Thus, amended independent claims 1 and 7, and dependent claims 2-6 and 8, 9-13, 15, 16, 18 and 19, are believed to be allowable over 35 USC § 103(a) over Hollinger in view of Wesley.

Double Patenting

Applicants have herewith filed a terminal disclaimer to overcome the examiner's rejection.

In conclusion, claims 1-13, 15, 16, 18 and 19 as presently amended and previously filed before the examiner are now believed to be in condition for allowance, and early notification thereof is respectfully requested.

Respectfully submitted,

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